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some general principles of biological and non-biological folk classification¹

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Berlin, Breedlove, and Raven (1973) have outlined several general principles relating to biological folk taxonomy that promise to “throw considerable light on prescientific man’s understanding of his biological universe” (1973:214). Our investigation of a number of “non-biological” folk taxonomies indicates that some of these principles are more pervasive with respect to folk classification in general than indicated by these authors. Furthermore, our study suggests that Berlin’s (1972:53) description of the “sometimes capricious and apparently arbitrary” classification of phenomena other than plants and animals is inaccurate. We present data demonstrating that certain “biological” principles extend to non-biological folk taxonomy and, in some instances, to “non-taxonomic” classification as well.² These principles, more than illuminating “man’s understanding of his biological universe,” are a few of perhaps many awaiting discovery relating to more general aspects of human psychic unity.

Folk taxonomies, biological or otherwise, are derived in terms of how native informants state the propositional relationship “class inclusion” to hold among named categories of things (cf. Tyler 1969:17).³ Conklin (1962:128) defines a folk taxonomy as “a system of . . . labeled folk segregates related by hierarchic inclusion.” A segregate is “any terminologically-distinguished (i.e., conventionally-named) grouping of objects” (Conklin 1962:121).

In English, for example, evergreens, oaks, and maples constitute a segregate by being labelled “trees,” and trees, vines, and grasses constitute another segregate, “plants.” Segregates are related by class inclusion—“trees” are members of a class of things named “plants”—and are “folk taxa” of a taxonomy. A folk taxonomy is referred to by use of the name of its “unique beginner” which is the most inclusive folk taxon in the taxonomy (cf. Berlin, et al. 1973:215), e.g., “plant” taxonomy.

The principles of Berlin, et al., which were initially derived for Tzeltal Maya “plant” taxonomy, are demonstrated by them to pertain to biological taxonomies of seven non-Western languages in addition to Tzeltal (1973:227-240). The senior author of this paper (Brown 1972) has also documented them for Huastec “plant” systematics. With the possible exception of two of their generalizations discussed elsewhere by the senior

Principles of taxonomy and nomenclature in folk biology first outlined by Berlin, Breedlove, and Raven (1973) are shown to extend to non-biological and non-taxonomic folk classification. Four non-biological taxonomies, American English “automobile” and “tool” taxonomies, a Finnish “winter vehicle” taxonomy, and a Thai “spirit-ghosts” taxonomy, are presented which clearly manifest so-called “biological” principles. In addition, a Huastec (male) “body” partonomy is described, offering evidence that taxonomic principles to some extent pertain to non-taxonomic systematics. These data indicate that principles originally attributed solely to biological classification actually relate to more general aspects of human psychic unity.

author (Brown 1974), these principles will be verified many times as research in the area of folk biological classification continues. In the meantime, this paper suggests that similar, if not the same, principles should be formulated for non-biological systems of folk classification as well.

Berlin, et al.'s principles

Berlin, et al. postulate that biological folk taxonomies rarely exceed *five* hierarchic levels in depth (1973:215). As a rule, no more than five folk taxa will be lineally juxtaposed with respect to class inclusion anywhere in a biological folk taxonomy. In addition, they determine five unique ethnobiological categories, the taxa of which correspond paradigmatically to the five hierarchic levels. These are the "unique beginner," "life forms," "generics," "specifics," and "varietals." Berlin, et al. label the five hierarchic levels "Level 0" through "Level 4" and describe the unique beginner, or most inclusive taxon, as characteristically occurring at Level 0, life form and generic taxa at Level 1, generic and specific taxa at Level 2, specific and varietal taxa at Level 3, and varietal taxa at Level 4 (1973:215).

Berlin, et al. also describe a "nomenclature principle" according to which life form and generic taxa are characteristically labelled by "primary lexemes" and specific and varietal taxa by "secondary lexemes" (1973:215-216). Primary and secondary lexemes are distinguished from one another in terms of the manner in which they are linguistically analyzed and whether or not the taxa they label occur in "contrast sets" in taxonomies (1973:217). Unanalyzable lexemes such as *tree*, *vine*, *oak*, or *perch* are always primary. Analyzable primary lexemes fall into two categories, "productive" and "unproductive." Productive primary lexemes "are distinguishable in that one of the constituents of each expression indicates a category superordinate to that of the form in question, e.g., *tuliptree* is a kind of *tree*, . . . *pipevine* is a kind of *vine*, and so on" (1973:217). Unproductive primary lexemes are distinguishable "in that no constituent marks a category superordinate to the forms in question. Thus *beggar-tick* is not a kind of *tick*, *jack-in-the-pulpit* has little to do with either *jack* or *pulpit*" (1973:217).

Secondary lexemes are like productive primary lexemes "in that one of the constituents of such expressions indicates a category superordinate to the form in question, e.g., *jack oak* (a kind of *oak*)" (1973:217). They differ from productive primary lexemes in that they occur in "contrast sets." A contrast set is a set of taxa belonging to the same immediately superordinate taxon, *all* of whose labels contain constituents marking that superordinate category. *Post oak*, *scrub oak*, *blue oak*, etc., for example, are constituents of the contrast set of the taxon *oak* (cf. 1973:217). *Planetree*, *tuliptree*, *maple*, *walnut*, *elm*, etc., all of which are immediately included in the category *tree*, do *not* constitute a contrast set because only *some* members of this group possess the constituent label *tree*. The latter analyzable forms are consequently productive primary lexemes rather than secondary ones.

The nomenclature principle can be stated as a set of four generalizations. Berlin, et al. propose that in any biological folk taxonomy:

(1) Some taxa marked by primary lexemes are terminal [a terminal taxon is one which includes no other labelled taxa] or immediately include taxa designated by secondary lexemes. Taxa satisfying these conditions are generic; their labels are generic names.

(2) Some taxa [other than the taxon which is the unique beginner] marked by primary lexemes are not terminal and immediately include taxa designated by primary lexemes. Taxa satisfying these conditions refer to life form categories; their labels are

life form names.

(3) Some taxa marked by secondary lexemes are terminal and are immediately included in taxa designated by primary lexemes. Taxa satisfying these conditions are specific; their labels are specific names.

(4) Some taxa marked by secondary lexemes are terminal and are immediately included in taxa which are designated as well by secondary lexemes. Taxa satisfying these conditions are varietal; their labels, varietal names (1973:218-219).

In addition to the principles outlined above, Berlin, et al. find that life form taxa are usually few in number, ranging from five to ten (1973:215). In contrast, generic taxa, most of which are included under life forms, tend to be the most numerous in biological taxonomies (1973:215-216). Specific and varietal taxa are less numerous than generic taxa (1973:216), and the occurrence of varietal taxa seems to be rare (cf. 1973:221).

non-biological extensions of principles

An initial survey of non-biological data suggests that at least one of these principles always extends to folk systematics while others pertain to non-biological taxonomies in a somewhat less consistent but obviously apparent manner. The most pervasive principle is that taxonomies rarely exceed a maximum hierarchic depth of five levels.

The first published account presenting a folk taxonomy that does not treat the traditional biological categories “plants” and “animals” is Frake’s (1961) study of the diagnosis of disease among the Subanun of Mindanao in the Philippines. Frake (1961:118) describes a taxonomy of Subanun “skin diseases” whose maximum hierarchic extension is to *four* levels. The senior author of this paper has elicited a Huastec “disease” taxonomy, consisting of ninety-six folk taxa, which is likewise extended maximally to *four* hierarchic levels (Brown 1971:303-307).

Several “non-biological” folk taxonomies have been described that manifest the taxonomic “depth” principle. Spradley (1970) has elicited three non-biological taxonomies from Seattle “urban nomads” or “tramps”: a taxonomy of *trusties*, i.e., incarcerated tramps differentiated in terms of the kinds of in-jail tasks assigned to them, a taxonomy of *flops* or places to sleep, and a taxonomy of *time* referring to the lengths of jail sentences tramps receive. The “trusty” taxonomy maximally extends to *four* hierarchic levels (1970:88-89), the “flop” taxonomy to *five* (1970:100-104), and the “time” taxonomy to *three* (1970:196-197). Hage (1972:266-269) describes a (*Münchner*) *bier* “Munich beer” taxonomy that does not exceed at its greatest depth *four* hierarchic levels, and, incidentally, is in perfect agreement with other general principles outlined by Berlin, et al.⁴ Tables 1-4 display four additional, previously unpublished non-biological taxonomies, all of which are well within the limits of the depth principle and to one degree or another manifest other general principles.⁵

In Tables 1-4 below, the relative hierarchic level, the taxonomic category (alias Berlin, et al.’s “ethnobiological category”), and nomenclature status of each taxon *for which they can be established* are indicated by use of the following abbreviations (if not established, no identification is given):

<i>Hierarchic Level:</i>	<i>Taxonomic Category:</i>	<i>Nomenclature Status:</i>
Level 0 – L0	Unique beginner – UB	unanalyzable primary lexeme – PL
Level 1 – L1	life form – lf	productive primary lexeme – PPL
Level 2 – L2	generic – gn	unproductive primary lexeme – UPL
Level 3 – L3	specific – sp	secondary lexeme – SL
Level 4 – L4	varietal – vr	

Table 1. American folk taxonomy of "automobiles."⁶

LO-UB	automobiles (PL)
L1-lf	American Motors automobiles (PPL)
L2-gn	Rambler (PL)
L3-sp	Rambler American (SL)
L3-sp	Rambler Rebel (SL)
L4-vr	Rambler Rebel (SL)
L4-vr	Rambler Rebel wagon (SL)
L3-sp	(10 additional specific taxa which include 0 varietal taxa)
L2-gn	Gremlin (PL)
L3-sp	Gremlin (SL)
L3-sp	Gremlin X (SL)
L2-gn	Hornet (PL) (includes two specific taxa which include 0 varietal taxa)
L2-gn	Ambassador (PL) (includes two specific taxa which include 0 varietal taxa)
L2-gn	(4 additional generic taxa which include 0 specific taxa)
L1-lf	Chrysler Corporation automobiles (PPL)
L2-gn	Dodge (PL)
L3-sp	Dodge Dart (SL)
L4-vr	Dart Demon (SL)
L4-vr	Dart Demon 340 (SL)
L4-vr	Dart Swinger (SL)
L3-sp	Dodge Challenger (SL)
L4-vr	340 Sixpack Challenger (SL)
L4-vr	440 Sixpack Challenger (SL)
L3-sp	(5 additional specific taxa which include 0 varietal taxa)
L2-gn	Plymouth (PL) (includes 9 specific taxa which include 13 varietal taxa)
L2-gn	Chrysler (PL) (includes 5 specific taxa which include 0 varietal taxa)
L1-lf	Ford Corporation automobiles (PPL)
L2-gn	Ford (PL) (includes 22 specific taxa which include 30 varietal taxa)
L2-gn	Lincoln (PL) (includes 3 specific taxa which include 0 varietal taxa)
L2-gn	Mercury (PL) (includes 7 specific taxa which include 4 varietal taxa)
L1-lf	General Motors automobiles (PPL) (includes 5 generic taxa which include 63 specific taxa which include 40 varietal taxa)
L1-lf	German automobiles (PPL) (includes 3 generic taxa which include 17 specific taxa which include 14 varietal taxa)
L1-lf	(5 additional life form taxa [foreign makes] which include 25 generic taxa which include 54 specific taxa which include 0 varietal taxa)
L1-gn	Nash (PL)
L1-gn	Hudson (PL)
L1-gn	Studebaker (PL) (includes 3 specific taxa which include 0 varietal taxa)
L1-gn	(16 additional generic taxa which include 0 specific taxa)

As predicted from biological systematics, all four taxonomies demonstrate life form and generic taxa occurring at Level 1 and generic and specific taxa at Level 2. All taxa established as life forms or generics are, as expected, labelled by primary lexemes. In addition, the number of life form taxa occurring in each taxonomy is small so as not to deviate significantly from the range for biological taxonomies, i.e., five to ten. The "automobile" taxonomy has eleven life forms, the "tool" taxonomy six, the Finnish "winter vehicle" taxonomy and the Thai "spirit-ghosts" taxonomy three each.

Specific taxa, identified in Tables 1-4, occur at Levels 2 and 3, in accordance with the general principle. In a number of instances, taxa are identified as specific and labelled by secondary lexemes while their labels are overtly unanalyzable primary lexemes, e.g., *Gremlin* of Level 3 of the "automobile" taxonomy. These labels are examples of the common taxonomic phenomenon (cf. Frake 1961:119; Greenberg 1966:25) where the same linguistic form is used at different levels of contrast in folk taxonomies, e.g.,

Table 2. Finnish “winter vehicle” taxonomy.⁷

L0-UB	<i>talvikulkuneuvoja</i> (PL) ‘winter vehicle’
L1-lf	<i>reki</i> (PL) ‘sledge/sleigh’
L2-gn	<i>reki</i> (PL) (no English gloss)
L3-sp	<i>työreki</i> (SL) ‘work sleigh’
L4-	<i>parireki</i> (no English gloss)
L4-	<i>pukkareki</i> (no English gloss)
L4-	<i>kolareki</i> (no English gloss)
L3-sp	<i>ajélureki</i> (SL) ‘pleasure sleigh’
L2-gn	<i>kotti</i> (PL) (no English gloss)
L1-lf	<i>sukset</i> (PL) ‘skis’ (one-ski and two-ski varieties)
L2-gn	<i>sukset</i> (PL) ‘skiis’ (two-ski variety)
L3-sp	<i>sukset</i> (SL) ‘common skiis’
L3-sp	<i>mäkisukset</i> (SL) ‘down-hill skiis’
L3-sp	<i>maastosukset</i> (SL) ‘cross country skiis’
L3-sp	<i>kilpasukset</i> (SL) ‘racing skiis’
L3-sp	<i>lastensukset</i> (SL) ‘children’s skiis’
L2-gn	<i>kola</i> (PL) ‘one-ski work vehicle’
L3-	<i>hirsikola</i> (no English gloss)
L3-	<i>savinsuksi</i> (no English gloss)
L2-gn	<i>ajopuu</i> (PL) ‘one-ski pleasure vehicle’
L1-lf	<i>luistin</i> (PL) ‘skates’
L2-gn	<i>kauppaluistimet</i> (PPL) ‘store-bought skates’
L3-sp	<i>kaunoluistimet</i> (SL) ‘figure skates’
L3-sp	<i>pikaluistimet</i> (SL) ‘racing skates’
L3-sp	<i>hokkari luistimet</i> (SL) ‘hockey skates’
L2-gn	<i>puuluistimet</i> (PPL) ‘wooden skates’
L2-gn	<i>luuluistimet</i> (PPL) ‘bone skates’
L2-gn	<i>karvakenkä</i> (PL) ‘hairy skin boots’
L1-gn	<i>kelkka</i> (PL) ‘sled’
L2-sp	<i>lastenkelkka</i> (SL) ‘children’s sled’
L2-sp	<i>tolppakelkka</i> (SL) (no English gloss)
L2-sp	<i>potkukelkka</i> (SL) (no English gloss)
L2-sp	<i>mahakelkka</i> (SL) ‘toboggan/runner sled’
L1-gn	<i>lumikenkä</i> (PL) ‘snowshoes’
L1-gn	<i>aura</i> (PL) ‘snowplow’
L1-gn	<i>jäänärkijä</i> (PL) ‘ice-breaker’
L1-gn	<i>mootorikelkka</i> (PL) ‘snowmobile’

Gremlin of Level 3 is immediately included under *Gremlin* of Level 2. *Gremlin* of Level 3 is an example of a “type specific name” (cf. Berlin 1972:62). “Type generic names” also occur in non-biological taxonomies, e.g., *hammer* of Level 2 of the “tool” taxonomy.

Type-specific and type-generic names ordinarily may be modified by linguistic expressions glossed in English by such words as “genuine,” “regular,” or “ordinary” in contexts where ambiguity arises (cf. Berlin 1972:62-63). Only one example of a type-specific name is given in its modified form in the non-biological taxonomies, i.e., *regular screwdriver* of Level 2 of the “tool” taxonomy. Unmodified type specific names in the non-biological taxonomies are treated as secondary lexemes, assuming the

Table 3. American English “tool” taxonomy.⁸

L0-UB	tool (PL)
L1-If	hammer (PL)
L2-gn	hammer (PL)
L2-gn	ballpeen hammer (PPL)
L2-gn	sledge hammer (PPL)
L2-gn	mallet (PL)
L1-If	vise (PL)
L2-gn	clamp (PL)
L2-gn	press (PL)
L2-gn	bench vise (PPL)
L1-If	measure (PL) (includes 3 generic taxa which include 0 specific taxa)
L1-If	shovel (PL) (includes 3 generic taxa which include 0 specific taxa)
L1-If	axe (PL) (includes 3 generic taxa which include 0 specific taxa)
L1-If	pliers (PL) (includes 4 generic taxa which include 0 specific taxa)
L1-gn	screwdriver (PL)
L2-sp	regular screwdriver (SL)
L2-sp	“Phillips” screwdriver (SL)
L1-gn	saw (PL)
L2-sp	sabre saw (SL)
L3-	crosscut saw
L3-	ripsaw
L2-sp	keyhole saw (SL)
L2-sp	hacksaw (SL)
L2-sp	electric saw (SL)
L3-	band saw
L3-	buzz saw
L3-	jigsaw
L1-gn	wrench (PL) (includes 4 specific taxa which include 0 varietal taxa)
L1-gn	crowbar (PL) (includes 2 specific taxa which include 0 varietal taxa)
L1-gn	pick (PL) (includes 2 specific taxa which include 0 varietal taxa)
L1-gn	drill (PL) (includes 2 specific taxa which include 0 varietal taxa)
L1-gn	jack (PL)
L1-gn	awl (PL)

modifying agent is there in a covert sense.

With the exception of the “automobile” taxonomy, occurrence of folk taxa at Level 4 is spotty. While their labels do not correspond to the definition of “secondary lexemes,” most taxa occurring at Level 4 in the “automobile” taxonomy are nevertheless identified as varietals. Their labels are “abbreviated” secondary lexemes. For abbreviated forms

a portion of the name will be used to refer to the class as a whole. In general abbreviation will lead to the deletion of the generic constituent of the name (i.e. the head of the expression) and the specific portion of the name will become the head (Berlin, et al. 1973:222).

Dodge Dart Demon 340 of the “automobile” taxonomy for instance is abbreviated to *Dart Demon 340* at Level 4. Similarly, *Rambler Rebel Wagon* of Level 4 could have been abbreviated to *Rebel Wagon*. Such abbreviations constitute optional elicitations.

A number of generic taxa occurring at Level 1 in the non-biological taxonomies resemble “unaffiliated” generic taxa of biological taxonomies (cf. Berlin, et al.

Table 4. Thai “spirit-ghosts” taxonomy.⁹

L0-UB	<i>phǐisǎṇtheewadaa</i> (PL) ‘spirit-ghosts’
L1-lf	<i>theewadaa</i> (PL) ‘spirits (gods)’
L2-gn	<i>theewadaa</i> (PL) ‘godlings’
L3-sp	<i>theewadaa phrá in</i> (SL) ‘god of the second heaven’
L3-sp	<i>theewadaa phrá phrom</i> (SL) ‘guardian of the second heaven’
L3-sp	<i>theewadaa naṇ thoranee</i> (SL) ‘goddess of the Earth’
L2-gn	<i>wísùtthithêp</i> (PL) ‘pure god’
L2-gn	<i>somùtthithêp</i> (PL) ‘god-like’
L1-lf	<i>phǐithewadaa</i> (PL) ‘guardian spirits’
L2-gn	<i>phǐithammachat</i> (PL) ‘nature spirits’
L3-sp	<i>phǐithammachat chāo khǎw</i> (SL) ‘nature spirits of the mountain’
L3-sp	<i>phǐithammachat chāo pāa</i> (SL) ‘nature spirits of the forests’
L3-sp	<i>phǐithammachat chāo tǎa</i> (SL) ‘nature spirits of the harbors’
L2-gn	<i>phǐibanpāburùt</i> (PL) ‘ancestral spirits’
L3-	<i>phǐi ruan</i> ‘family spirits’
L3-	<i>phǐi bāan</i> ‘community spirits’
L3-	<i>phǐi muan</i> ‘national spirits’
L1-lf	<i>phǐipeesāad</i> (PL) ‘ghosts (demons)’
L2-gn	<i>phǐi taay hoon</i> (UPL) ‘ghosts of persons who suffer abnormal deaths’
L3-	<i>phǐi kumaan</i> ‘ghosts of stillborns’
L3-	<i>phǐi taay tōon krom</i> ‘ghosts of women who die during delivery’
L3-	<i>phǐi taay haa</i> ‘ghosts of persons who die as the result of disease’
L3-	<i>phǐi taay hoon</i> ‘ghosts of persons killed in accidents’
L2-gn	<i>phǐi sin</i> (UPL) ‘ghosts that possess people, witches’
L3-	<i>phǐi poob</i> ‘witch’
L3-	<i>phǐi krasǔ</i> ‘female witch’
L3-	<i>phǐi ploong</i> ‘enters human bodies as a glowing light’
L3-	<i>phǐi krahǎn</i> ‘enters human bodies as a glowing light’
L3-	<i>phǐi khāmòot</i> ‘enters human bodies as a glowing light’
L2-gn	<i>phǐi paa</i> (UPL) ‘jungle ghosts’
L3-	<i>phǐi koonkooy</i> ‘vampire cat’
L3-	<i>phǐi pòoṇ khaṇ</i> ‘vampire bat’

1973:219). Unaffiliated generics are always folk taxa occurring at Level 1 which differ from life form taxa in that they are either terminal or immediately include taxa designated by secondary lexemes; life form taxa, on the other hand, always immediately include taxa designated by primary lexemes. Berlin, et al. (1973:219) indicate that unaffiliated generics are usually recognized as exceptional by native informants. Tzeltal speakers, for example, recognize certain Level 1 taxa such as *čenek* ‘bean’ and *halal* ‘bamboo’ as somehow different from life form taxa such as *te* ‘tree’ and *wamal* ‘grasses,’ the former of which “are almost without exception cultivated and/or morphologically peculiar in some fashion” (Berlin, et al. 1973:219).

Nineteen generic taxa occur at Level 1 in the “automobile” taxonomy. While only three of these, *Nash*, *Hudson*, and *Studebaker*, are listed in Table 1, all nineteen exhibit a “morphological” peculiarity setting them off from all other “automobile” taxa, i.e., they are all “makes” which are no longer being manufactured. Similarly, several Level 1 generic taxa of the Finnish “winter vehicle” taxonomy resemble biological unaffiliated

generics in their exceptional nature. *Aura* ‘snowplow,’ *jäänärkijä* ‘ice-breaker,’ and *mootorikelkka* ‘snowmobile’ differ from other Finnish “winter vehicles” in that they are all motorized and seem to have been only recently incorporated into the taxonomy.

broadened interpretation of definitions

There are a number of taxa of the non-biological taxonomies for which nomenclature status and taxonomic category have not been established. For example, *crosscut saw* and *ripsaw* of Level 3 immediately included under the specific taxon *sabre saw* in the “tool” taxonomy cannot be regarded as secondary lexemes if the nomenclature principle prescribes that such expressions possess constituent linguistic elements which mark “immediate” superordinate categories. In this regard, neither *crosscut saw* nor *ripsaw* refer to the *sabre* element of their immediate superordinate taxon. In this example, expressions labelling lower level taxa have constituents indicating a superordinate category that is not immediate to them but in which they are nonetheless included, i.e., the generic taxon *saw*.

As outlined by Berlin, et al. (1973:217), linguistic expressions, in order to qualify as productive primary or secondary lexemes, need only contain a constituent marking a superordinate taxon. Taxa labelled by such lexemes need not be specified as always *immediately* included under the superordinate taxon referred to. (Invariably in biological taxonomies, superordinate categories include such taxa immediately.) If the definition of productive primary and secondary lexemes is explicitly broadened to include expressions with constituents marking *non-immediate* superordinate taxa, additional anomalies—especially apparent in the “tool” and “winter vehicle” taxonomies—are explained away; hence *crosscut saw* and *ripsaw* can be regarded as varietal taxa marked by secondary lexemes.

The Thai “spirit-ghosts” taxonomy presents a case of special elaboration of the “superordinate taxon reference principle.” The Thai taxonomy includes numerous examples of polylexemic items labelling terminal taxa of Level 3 that have constituents identical to constituents of expressions labelling their immediate and non-immediate superordinate taxa. For example, the initial lexeme *phī* of *phī poòng khaàŋ* ‘vampire bat’ is identical to a constituent of that taxon’s immediate superordinate category’s label *phīi paa* ‘jungle ghosts.’ *Phī poòng khaàŋ* can also be understood as referring to a constituent of the label for the life form taxon *phīteesàad* ‘ghosts (demons)’ and of the label for the unique beginner *phīsāŋtheewadaa* ‘spirit-ghosts.’ If partial reference to superordinate categories is formulated as a sufficient criterion for defining either productive primary or secondary lexemes, all unestablished taxa of Level 3 of the Thai taxonomy can be regarded as labelled by secondary lexemes and specific. At present, however, data are too incomplete to warrant regarding this formulation as a general principle.

In the context of broadened interpretations of definitions, almost all examples initially appearing anomalous prove non-deviant. It bears repeating that a fifth non-biological taxonomy, Hage’s (1972:266-269) “Munich beer” taxonomy, accords perfectly with the general principles. The taxonomies surveyed here suggest that further research in the area of non-biological systematics will confirm the pervasiveness of so-called “biological” principles in folk taxonomies in general.

“non-taxonomic” extension of general principles

Several general principles appear extended—but by no means consistently so—to at

least one kind of “non-taxonomic” system of folk classification. This system is formally derived in terms of how native informants state the propositional relationship “part of” to hold among named things.

An example is Spradley’s (1970:134-137) treatment of “Parts of the Bucket.” *Bucket* is used by Seattle tramps to refer to the city jail. The jail consists of two main parts, the *seventh floor* and the *sixth floor* of the Seattle Public Safety building. The “seventh floor” is subdivided into the *South* and *North wings* and the *Court area*. The *Court docket* and the *Courtroom* are immediate parts of the “Court area,” and so on. Classificatory systems based on the relationship “part of” are analyzable as possessing higher levels of generality, e.g., the “seventh floor” and the “sixth floor” of the Public Safety building, and lower levels of specificity, e.g., the “Court docket” and the “Courtroom.” Such systems resemble folk taxonomies in that relative hierarchic levels pertain to them as well.

To complement taxonomic jargon we employ the word *parta* (singular *parton*) to signify named things hierarchically juxtaposed through the propositional relationship “part of.” A system of *parta* related by “part of” inclusion is a *partonomy*. A partonomy, like a folk taxonomy, typically possesses a “unique beginner” which is the most inclusive parton in it. For instance, the unique beginner of Spradley’s partonomy is *bucket*, by way of which the partonomy is named, i.e., “bucket” partonomy.

Partonomies seem to conform to the “depth” principle characteristic of folk taxonomies. Basso’s (1972:348) Apache “man’s body” partonomy, for example, does not exceed *three* levels. On the other hand, both the “bucket” partonomy and the senior author’s Huastec (male) “body” partonomy (Table 5) extend maximally to six levels. In each instance, however, only *one* fifth level parton is subdivided at the sixth level. Taking the latter cases as exceptional, the characteristic maximum expansion of these two partonomies is to *five* levels.

The Huastec “body” partonomy is given in Table 5. The unique beginner (UB) *patal in hual* ‘body’ (literally, ‘all the body’) is indicated in Table 5 as occurring at Level 0 (L0) and other *parta* at Levels 1-5 (L1-L5), as the case may be.

Table 5. Huastec (male) “body” partonomy.¹⁰

L0-UB	<i>patal in hual</i> ‘body’
L1-	<i>ok</i> ‘head’
L2-	<i>hual</i> ‘face’
L3-	<i>pik’ib</i> ‘forehead’
L3-	<i>tša’ub</i> ‘cheek’
L3-	<i>tham</i> ‘nose’
L3-	<i>hui</i> ‘mouth’
L4-	<i>lek’ab</i> ‘tongue’
L4-	<i>ot’ol in hui</i> ‘lips’
L4-	<i>kamab</i> ‘teeth’
L5-	<i>elim</i> ‘incisor’
L5-	<i>kormiyo</i> ‘canine tooth’
L5-	<i>tšohol</i> ‘molar’
L3-	<i>hual</i> ‘eye’
L3-	(6 additional <i>parta</i> occur at this level as part of “ <i>hual</i> ” of L2)
L2-	<i>šutšun</i> ‘ear’
L2-	<i>nuk</i> ‘neck, throat’

Table 5 (cont'd)

L2-	<i>tšitš'in</i> 'skull cap'
L2-	<i>tšalap</i> 'brain'
L2-	<i>katšin</i> 'cerebrum'
L3-	<i>pulek te' ehattalab</i> 'spinal cord'
L2-	(4 additional parta occur at this level as part of " <i>ok'</i> ")
L1-	<i>akan</i> 'leg and foot'
L2-	<i>pulek akan</i> 'thigh'
L2-	<i>akan</i> 'lower leg and foot'
L3-	<i>sukul in akan</i> 'leg calf'
L3-	<i>tiyik' in akan</i> 'ankle'
L3-	<i>lemat in akan</i> 'bottom of foot'
L3-	<i>tihaš in akan</i> 'toes'
L4-	<i>mim in akan</i> 'great toe'
L4-	(4 additional parta occur at this level as part of " <i>tihaš in akan</i> ")
L3-	(2 additional parta occur at this level as part of " <i>akan</i> " of L2)
L1-	<i>sukul patal</i> 'trunk'
L2-	<i>patal in kuš</i> 'the back'
L3-	<i>okob</i> 'arm'
L4-	<i>pulek okob</i> 'upper arm'
L4-	<i>okob</i> 'lower arm'
L4-	<i>tiyik'</i> 'wrist'
L3-	<i>k'ubak</i> 'hand'
L4-	<i>tihaš in k'ubak</i> 'finger'
L4-	(8 additional parta occur at this level as part of " <i>k'ubak</i> ")
L3-	(6 additional parta occur at this level as part of " <i>patal in kuš</i> ")
L2-	<i>sukul</i> 'stomach'
L2-	<i>k'utumtal</i> 'alimentary canal'
L2-	(12 additional parta occur at this level as part of " <i>sukul patal</i> ")
L1-	<i>ot'ol in tu'ul</i> 'skin'
L1-	<i>tu'ul</i> 'flesh'
L1-	<i>šitš'al</i> 'blood'
L1-	<i>beklek</i> 'bone'

The Huastec partonomy obviously resembles a folk taxonomy in overt structure. In subtle ways it also manifests an "incipient incursion" of general principles of taxonomic classification.

The Huastec partonomy exhibits only seven parta occurring at its Level 1. Four of these, *ot'ol in tu'ul* 'skin,' *tu'ul* 'flesh,' *šitš'al* 'blood,' and *beklek* 'bone,' are terminal, i.e., remain undivided. They resemble unaffiliated generic taxa of folk taxonomies in that Huastec informants recognize them as "morphologically peculiar" and hence different from other "body" parta. They are described as the "building blocks" from which the body is constructed.

The remaining *three* Level 1 "body" parta, *ok'* 'head,' *sukul patal* 'trunk,' and *akan* 'leg and foot' resemble life form taxa of folk taxonomies. (It should be noted that the number *three* is not discordant with the numerical range for life form taxa occurring at Level 1 in folk taxonomies.) These parta are labelled by primary lexemes and are immediately divided into parta (at Level 2) designated by primary lexemes.

The “body” parta of lower levels, i.e., Levels 3-5, differ from folk taxa of equivalent taxonomic levels in that the former are labelled by primary lexemes. On the other hand, as is also the case for folk taxonomies, the superordinate category reference principle, which pertains to the definitions of both productive primary and secondary lexemes, is observed ubiquitous at lower, but not at higher, levels of the “body” partonomy. The four Level 3 parta, *sukul in akan* ‘leg calf,’ *tiyik in akan* ‘ankle,’ *lemat in akan* ‘bottom of foot,’ and *tihaš in akan* ‘toes,’ for instance, linguistically refer to their immediate superordinate parton *akan* ‘lower leg and foot.’ Twenty-two of twenty-six or 85 percent of parta occurring at Levels 3 and 4 demonstrate the superordinate category reference principle, while twenty-eight of thirty-four or 72 percent of Level 1 and 2 parta do not. This also means that more than a majority of the unanalyzable primary lexemes pertaining to the partonomy name parta occurring at Level 2, where, predicting from folk taxonomy, one would expect to find generics usually labelled by unanalyzable primary lexemes.

The Huastec partonomy demonstrates another phenomenon characteristic of folk taxonomies, i.e., the use of the same linguistic form at different levels. The most notable example is *hual*, which occurs as a constituent of the unique beginner label, *patal in hual*, as the label for the Level 2 parton designating ‘face,’ and as a label for the Level 3 parton designating ‘eye.’ Informants explain that *hual* refers to that which is “looked at” when one encounters another human. One looks at the ‘whole body’ *patal in hual*, the ‘face’ *hual*, and the ‘eye’ *hual* during the course of an encounter. *Okob* also occurs at two levels designating ‘arm’ at the higher and ‘lower arm’ at the lower. Similarly, at two levels *akan* designates ‘leg’ and ‘lower leg and foot.’

conclusions

In this article we have assembled data bearing on the nature of folk classification in general. We have shown that certain general principles originally attributed solely to biological systematics extend to non-biological taxonomy and to “non-taxonomic” classification as well. Some of our conclusions are:

(1) Non-biological taxonomies, like biological ones, rarely, if ever, exceed a maximum hierarchic depth of five levels. In addition, limited data suggest that “non-taxonomic” partonomies are not discordant with the taxonomic depth principle.

(2) There are five taxonomic categories (alias Berlin, et al.’s “ethnobiological categories”), the taxa of which correspond paradigmatically to the five hierarchic levels of both biological and non-biological taxonomies. Two of these categories, life form and generic taxa, are as a rule labelled by primary lexemes, and two others, specific and varietal taxa, by secondary lexemes. Apparent exceptions to this nomenclature principle in non-biological taxonomies prove non-exceptional in terms of broadened definitions of productive primary and secondary lexemes. At least one “non-taxonomic” example, the Huastec “body” partonomy, offers evidence that life form and generic categories pertain to partonomies.

(3) The number of life form taxa occurring in non-biological taxonomies is small so as not to deviate significantly from the range for biological taxonomies. This range for taxonomies in general appears to be three to eleven. Correspondingly, the Huastec “body” partonomy manifests *three* life form-like categories.

(4) Generics occurring at Level 1 in non-biological taxonomies often resemble “unaffiliated” generics of biological taxonomies in that they, too, exhibit “morphological peculiarities.” The Huastec “body” partonomy contains terminal parta occurring at Level

1 which resemble unaffiliated generics in that they are regarded as “different” from other “body” parts. This suggests that the “principle” of unaffiliated generics is extended to non-taxonomic classification.

(5) The Huastec “body” partonomy offers evidence that the common taxonomic phenomenon of occurrence of the same linguistic form at different levels of inclusiveness may be characteristic of non-taxonomic classification as well.

Berlin (1972:53) writes, “unlike the sometimes capricious and apparently arbitrary classification of certain social phenomena, all men appear to be constrained in their conceptualization of the world of plants and animals.” The findings reported here suggest that such constraints extend beyond biological and perhaps even beyond taxonomic classification. Whether the general principles of Berlin, et al. are in some sense primarily attributed to biological taxonomy and only secondarily, perhaps by analogy, to non-biological and non-taxonomic classification, or whether the human mind is innately predisposed to a certain way of naming and classifying biological and non-biological phenomena alike is a question left to be resolved.

notes

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² Most of the previously unpublished data contained in this paper were collected by the junior authors.

³ Folk taxonomies and other classificatory systems illustrated here were all collected through controlled eliciting. See Black (1969) for a good description of the elicitation technique.

⁴ The other published non-biological taxonomies mentioned reflect other general principles in a somewhat less consistent manner than the “Munich beer” taxonomy.

⁵ In reviewing the taxonomies of Tables 1-4, the reader should be cautioned to remember that the distinction between “folk” and “scientific” biological taxonomies has its analogue in non-biological classification. The “automobile” taxonomy, for instance, does not fully nor precisely reproduce taxonomic distinctions and nomenclature one could collect from dealer manuals listing makes and models. Such manuals can be likened to the corpus of data relating to standard scientific classification in botany and may bear the same kind of relationship to folk classification of automobiles as usual Linnaean botanical classification does to folk “plant” systematics. The nature of this relationship as it pertains to botanical studies has been discussed by Berlin, Breedlove, and Raven (1966).

⁶ The American folk taxonomy of “automobiles” was elicited by Phillip Volkman from male dorm dwellers at Northern Illinois University. For lack of space it is given in an abbreviated form. Certain kinds of elicited information have been regarded as secondary to taxonomic consideration and are consequently not explicitly included in the taxonomy. This information pertains to typical options offered by automobile dealers, such as body style, engine size, and number of doors. These formally bear the peculiar propositional relationship “options of” to labelled taxa in the “automobile” taxonomy.

⁷ The Finnish “winter vehicle” taxonomy was gathered by Barbara J. Torrey from native Finns living in the Northern Illinois University area. A number of Finnish terms lack equivalent English glosses. English glosses are given where possible. Where not given, the general meaning of taxa can only be gathered through reference to superordinate taxa and their glosses.

⁸ The American English “tool” taxonomy was elicited by John Kolar from male undergraduates at Northern Illinois University. Kolar found that informants were capable of generating unusually large numbers of labels for tools after observing that “almost anything could be a tool,” such as electricity, clay, cloth, etc. When asked if they regard such things as tools in the same sense they so regard hammers, shovels, saws, etc., informants generally replied negatively. The taxonomy of Table 3 includes labels for tools of the latter sense that were consistently elicited. For lack of space the “tool” taxonomy is given in an abbreviated form.

⁹ Data for the Thai “spirit-ghosts” taxonomy was gathered by Tipawan Trūṅg-Quang, a native of Thailand. Data was elicited from Thai students at Northern Illinois University and cross-checked against other sources (especially Rajadon 1969).

¹⁰The Huastec (male) "body" partonomy, which is given in an abbreviated version, was collected by the senior author during a field trip in Mexico in 1969-1970 supported by a Shell International Studies Research Fellowship.

Huastec is a Maya language spoken in Northern Veracruz and Eastern San Luís Potosí. The data presented in Table 5 were collected from Northern Veracruz Huastec speakers.

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